

Risk Management of Environmentally Constrained Infrastructures

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Summary

Risk profiling of major infrastructures is critical in an increasingly challenging world influenced by social, environmental, legal and political factors. This risk management model and approach provides both a conceptual and systematic framework to the identification of hazards, vulnerability assessment and risk control methodology to the design and building of infrastructure and structures in environmentally constrained environments. Key areas of focus will include a pro-active look at physical building constraints, location, fire and essential services, and the impact of neighbouring facilities and utilities.

Keywords: Risk; structure; audit; hazard; system; vulnerability; environment; fire.

1. Introduction

The conceptual identification of hazards, structure vulnerability, and assessment of risks is an essential component of building infrastructure design, construction and management, particularly in constrained environments.

This paper proposes a quantitative risk evaluation platform for industry stakeholders that allows the identification, assessment and control of risks from the conceptual stage to the management of built structures in constrained environments. A focus will be made on exploring pro-active risk management practices and the implementation of suitable controls that marry the types of risks infrastructure is exposed to in this transforming international environment.

This paper will challenge traditional engineering design criteria, practices and research by key building professionals. A fresh new holistic approach is proposed in the application of pro-active risk management practices to the design of structures and infrastructure.

2. Risk & Vulnerability Assessment

2.1 The Concept of Risk Management

Building designers, engineers and architects are required, either by legislation, by industry precedent, or by public expectations, to make structures safe as far as is reasonable practicable within the constraints of the environment. A holistic risk management framework is proposed for designers to review and explore, using simple tools.

As part of any proposed structure or infrastructure development, there needs to be an overall framework for design decisions to be made. This framework needs to consider a risk exploration and risk control phase.

- The risk exploration phase requires the formalisation of hazard identification techniques including information gathering, understanding of the physical and environmental constraints, in order to ensure that the desired outcomes of a particular project will not be adversely affected.
- Once the exploration phase has been systematically executed key risk issues and hazards are then assessed using risk management tools, which can include performance based risk